To: Scanning (Remsen Bldg.)
From: Board of Patent Appeals and Interferences (BPAI)

Scanning Coversheet

Serial No. 09/856,342

Incoming _____ Date Received: _____

Outgoing ✓ Date Mailed: 5/14/07

TOC Code: APDA

Document Name: _____

Annotations: _____

_____

Note: Check box if this paper has been mailed by BPAI. ☑

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte HERMANN BRÜGGENDICK and ANDREAS HOSPITAL

Appeal 2007-0521
Application 09/856,342
Technology Center 3700

ON BRIEF

Before ADAMS, GRIMES, and GREEN, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a method of burning a nitrogen-containing fuel. The Examiner has rejected the claims as anticipated or obvious. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

BACKGROUND

The Specification describes a combustion method comprising producing a sub-stoichiometric flame zone and introducing a nitrogen oxide

reducing agent into that flame zone (Specification 4).[1] The reducing agent can be a nitrogen compound or a hydrocarbon (*id.* at 4-5).

"The nitrogen oxide reducing agent . . . is preferably introduced into the sub-stoichiometric flame zone together with the fuel. Furthermore, it can be advantageous to introduce the nitrogen oxide reducing agent into the sub-stoichiometric flame zone together with the primary air. . . . Furthermore, it is possible to blow into the flame at least a portion of the primary air as core air, whereby this preferably occurs together with the nitrogen oxide reducing agent" (*id.* at 6).

DISCUSSION

1. CLAIMS

Claims 7-9, 11, 12, and 16-19 are pending and rejected by the Examiner. The claims have not been argued separately and therefore stand or fall together. 37 C.F.R. § 41.37(c)(1)(vii). We will focus on claim 7, the broadest claim on appeal, which reads as follows:

> 7. A method of burning a nitrogen-containing fuel while reducing the emission of nitrogen oxides, said method including the steps of:
>
> producing a sub-stoichiometric primary zone in the form of a flame core from all of the fuel and primary air, and supplying said flame core with a nitrogen oxide reducing agent so that said reducing agent is distributed within said flame core, wherein said reducing agent is a nitrogen compound or a hydrocarbon.

---

[1] We understand "sub-stoichiometric" to mean that the zone contains less air than fuel. See the specification, page 3, lines 9-18 ("Air is not suitable since the reduction zone must remain sub-stoichiometric. . . . The portion of resultant NO is comparatively low due to the lack of oxygen in the reduction zone.").

Thus, in the method of claim 7, the fuel and primary air are used to form a flame core in which the air to fuel ratio is less than one and a nitrogen oxide reducing agent (either a nitrogen compound or a hydrocarbon) is distributed within the flame core.

"It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their broadest reasonable interpretation consistent with the specification and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Sneed*, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983) (citation omitted).

The Examiner argues that a flame core can contain multiple zones having different air to fuel ratios (Answer 6-7). Appellants have pointed to nothing in the specification indicating that a "primary zone in the form of a flame core" cannot contain multiple zones having different air to fuel ratios, nor have they presented any evidence that one of ordinary skill in the art would not consider a flame having multiple zones with different air to fuel ratios to be a "primary zone in the form of a flame core." Therefore, we find the Examiner's interpretation of claim 7 to be a reasonable one.

2. ANTICIPATION

Claims 7, 9, 11, 12, and 19 stand rejected under 35 U.S.C. § 102(b) as anticipated by Leikert.[2] The Examiner relies on Leikert for disclosing "a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides" by "producing a fuel-rich (i.e. sub-stoichiometric) primary flame core (zones 7 and 8) from all of the fuel supplied to [the] core and

---

[2] Leikert et al., U.S. Patent No. 4,790,743, issued December 13, 1988.

primary air and adding a nitrogen oxide reducing agent (via nozzles 4) wherein the agent may consist of coal dust (i.e. a hydrocarbon fuel and thus a hydrocarbon as claimed) (see col. 2, lines 44-56)" (Answer 3).

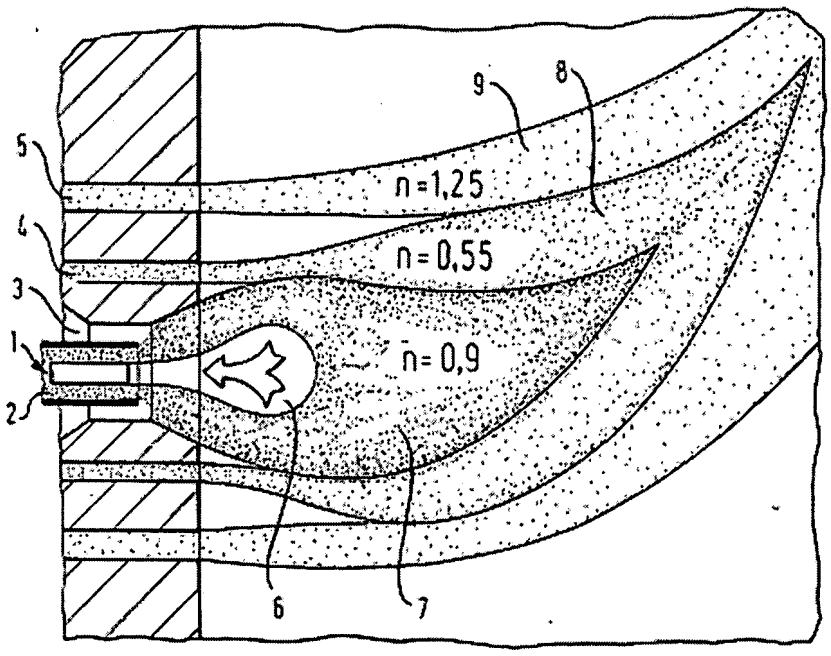
The Examiner argues that Leikert meets the "the limitation that the reducing agent is distributed within the flame core" because "flame zones (7 and 8) of Leikert taken together are properly considered the flame core," secondary zone (8) "being 'in the vicinity and around the primary flame zone' (see col. 3, lines 34-35)" (Answer 4). Therefore, the Examiner argues that, "[a]s shown in Fig. 1, the reducing agent supplied via nozzles (4) is clearly distributed within the flame core formed from flame zones (7 and 8)" (*id.*).

We agree that the Examiner has set forth a prima facie case of anticipation. Leikert describes a "method for the reduction of the NO_x-emission during the combustion of nitrogen-containing fuels" (col. 2, ll. 7-8). The method comprises:

> feeding coal dust along with its carrier gas to the primary burner and generating a primary flame zone . . . and burning the coal dust under fuel-rich conditions,
>
> feeding reduction fuel into the combustion chamber and generating a secondary flame zone in the vicinity of the primary flame zone and being operated under more-fuel-rich conditions than the primary flame zone, and
>
> feeding stage air into the combustion chamber and generating a final combustion zone in the vicinity of the secondary flame zone and being operated under fuel lean conditions.

Leikert, col. 2, ll. 19-31.

Leikert's Figure 1 is reproduced below:



The figure is said to show the three flame zones: primary flame zone 7, secondary flame zone 8, and final burn out zone 9 (Leikert, col. 3, ll. 3-45).

We agree with the Examiner that the "primary zone" recited in claim 7 can contain more than one zone having different air to fuel ratios. We also agree with the Examiner that zones 7 and 8 can together be considered a "primary zone in the form of a flame core."

Zones 7 and 8 are both fuel-rich; that is, they both have a ratio of air to fuel less than one (Leikert, col. 3, ll. 19-22 and 40-43). Zone 7 is formed when "coal dust along with its carrier air is injected as primary fuel through . . . area 2" and "[m]antle air is supplied through . . . area 3" (*id.* at col. 3, ll. 14-18). The air-to-fuel ratio of zone 7 is 0.9 (*id.*, col. 3, ll. 61-62). Fuel nozzles 4 inject reduction fuel (i.e., more coal dust; *id.* at col. 2, ll. 44-46), resulting in an air-to-fuel ratio of 0.55 in zone 8 (*id.* at col. 3, l. 62). Thus,

zones 7 and 8 together form "a sub-stoichiometric primary zone in the form of a flame core."

Leikert discloses that the "secondary flame zone is operated under a more fuel-rich condition, so that it provides a reducing atmosphere reducing the NO_x produced in the primary flame zone" (col. 3, ll. 40-43). In addition, Leikert discloses that it is advantageous to "use coal dust along with its carrier gas as reduction fuel" (col. 2, ll. 44-46). We agree with the Examiner that feeding coal dust along with its carrier gas as the reduction fuel meets the limitation of "supplying said flame core with a nitrogen oxide reducing agent so that said reducing agent is distributed within said flame core, wherein said reducing agent is . . . a hydrocarbon," as recited in claim 7.

Appellants disagree with the Examiner's position "that the sub-stoichiometric primary zone 7 and the secondary fuel zone 8 of Leikert can be interpreted to be a 'flame core' in the sense of the present invention," arguing that "Leikert *unambiguously* discloses that its reducing agent is *not* introduced into its primary flame zone 7 but, instead, is introduced *around* this primary flame zone" and that "its secondary zone 8 is separate and different from its primary flame zone 7" (Br. 5-6).

We are not persuaded by this argument. Appellants are correct that Leikert describes injecting reduction fuel "around the primary flame zone 7" to form a secondary flame zone 8 that has a different air to fuel ratio (col. 3, ll. 31-43). However, for the reasons discussed above, we agree with the Examiner that zones 7 and 8 can properly be viewed together as a "flame core." Thus, we do not agree with Appellants' position that Leikert does not disclose "supplying said flame core with a nitrogen oxide reducing agent."

Appellants have provided no evidence that one of ordinary skill in the art would not consider Leikert's zones 7 and 8 together to be a "primary zone in the form of a flame core." In particular, the fact that Leikert refers to zones 7 and 8 as primary and secondary zones, respectively, does not mean that these zones cannot together also be considered a primary zone.

Appellants also argue that "the NO_x reduction mechanism of Leikert is quite different than that of the present invention" (Br. 6). We are not persuaded by this argument. Although the reduction mechanism described in the present specification may be different than in Leikert, in our view claim 7 encompasses the method disclosed by Leikert. Thus, claim 7 does not define a NO_x reduction mechanism that is different from Leikert.

In addition, Appellants argue that, "although Leikert discloses that coal dust can be injected into its primary flame zone 7, Leikert does *not* teach or disclose that coal dust introduced into its primary flame zone 7 is a reducing agent" (Br. 7). However, the Examiner is not relying on the coal dust introduced into the primary zone to be the reducing agent. Instead, as discussed above, the Examiner is relying on the coal dust being introduced into flame zone 8 to be the reducing agent. Thus, we are not persuaded by this argument.

Appellants also argue that:

> in the present invention as recited in claim 7, the NO_x reducing agent is introduced *directly* into the primary zone - that is, the flame core at which the combustion fuel and the primary air are fed - so that the NO_x reducing agent is distributed in the flame core. In the event that the respective NO_x reducing agent that is introduced is a hydrocarbon, this hydrocarbon is not a nitrogen-containing fuel and this hydrocarbon remains practically

> unburned and therefore does not substantially contribute to the heat production.

(Br. 8-9.) In addition, Appellants argue that, "in the present invention, the reducing agent is not burned at the location in which it is introduced (the sub-stoichiometric primary zone in the form of a flame core) by reason of a lack of oxygen in this sub-stoichiometric primary zone" (Reply Br. 4).

We are not persuaded by these arguments. First, we interpret claim 7 to read on a primary zone encompassing more than one zone having different air to fuel ratios, specifically to encompass both of zones 7 and 8 of Leikert; we therefore agree with the Examiner that Leikert describes introducing a reducing agent directly into the primary zone. Second, claim 7 does not indicate that the reducing agent cannot be a nitrogen-containing fuel or that it is not burned.

We conclude that the Examiner has set forth a prima facie case that claim 7 is anticipated by Leikert, which Appellants have not rebutted. We therefore affirm the rejection of claim 7 under 35 U.S.C. § 102. Claims 9, 11, 12, and 19 fall with claim 7.

3. OBVIOUSNESS

Claims 7 and 17 stand rejected under 35 U.S.C. § 103 as obvious over Leikert in view of Vier.[3] We have already found that claim 7 is anticipated by Leikert. "[A]nticipation is the epitome of obviousness." *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548, 220 USPQ 193, 198 (Fed. Cir. 1983). Thus, we conclude that claim 7 would have been obvious over

---

[3] Vier et al., U.S. Patent No. 4,739,713, issued April 26, 1988.

Leikert in view of Vier. We therefore affirm the rejection of claim 7 under 35 U.S.C. § 103. Claim 17 falls with claim 7.

4. UNAPPEALED REJECTIONS

Claims 8 and 18 stand rejected under 35 U.S.C. § 103 as obvious over Leikert in view of Beer.[4] Claim 16 stands rejected under 35 U.S.C. § 103 as obvious over Leikert in view of Vier and Svendssen.[5] Appellants have not appealed these rejections (Br. 4); we therefore affirm them.

OTHER ISSUES

Claim 17 depends from claim 7 and requires that the nitrogen oxide reducing agent is "a nitrogen compound comprising at least one compound selected from the group consisting of natural gas and methane." However, neither natural gas nor methane is a nitrogen compound. (Although natural gas may *contain* a nitrogen compound, it is not itself a nitrogen compound.) If there is any further prosecution of this application, appropriate action should be taken to deal with this apparent inconsistency.

SUMMARY

The Examiner's position is supported by the preponderance of the evidence of record. We therefore affirm the rejection of claims 7, 9, 11, 12, and 19 under 35 U.S.C. § 102(b) and the rejection of claims 7, 8, and 16-18 under 35 U.S.C. § 103.

---

[4] Beer et al., U.S. Patent No. 5,411,394, issued May 2, 1995.
[5] Svendssen, U.S. Patent No. 5,809,910, issued September 22, 1998.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Donald E. Adams)
Administrative Patent Judge)
)
)

) BOARD OF PATENT
Eric Grimes)
Administrative Patent Judge) APPEALS AND
)

) INTERFERENCES
)
Lora M. Green)
Administrative Patent Judge)

EG/MLM/lbg

ROBERT W. BECKER & ASSOCIATES
707 HIGHWAY 333
SUITE B
TIJERAS NM 87059-7507